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## Darwin's Citation Impact

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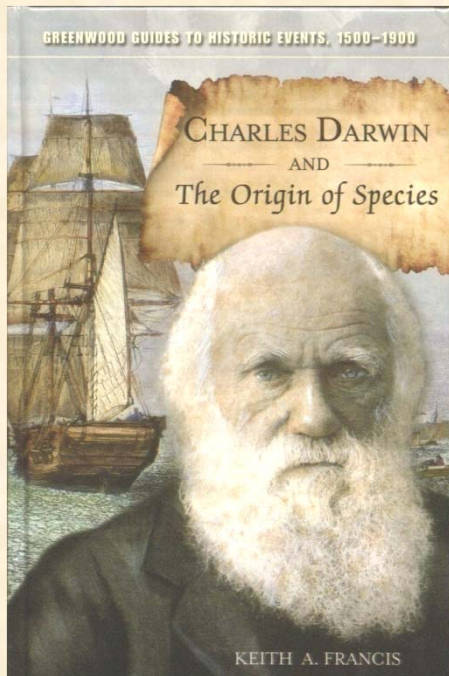
# Darwin's Citation Impact

## **Abstract**

This presentation covered basic definitions of impact factors, citation impact and *h* index. Then, looked at Charles Darwin's publication record, the process involved in determining his citation impact, and compared Darwin's citation impact to that of modern day researchers in ecology and evolutionary biology. Science is continually focusing on current research, new techniques, latest discoveries. Once in a while it's good to reflect back and re-examine the past.

## **Disciplines**

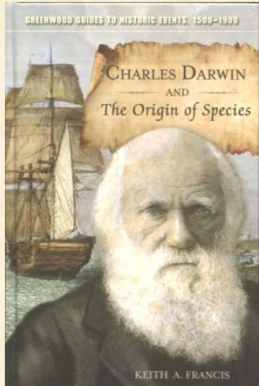
Library and Information Science



# Darwin's Citation Impact

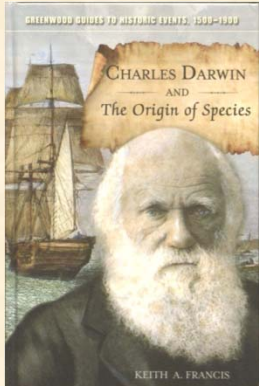
Feb. 12, 2009

Lorrie Pellack



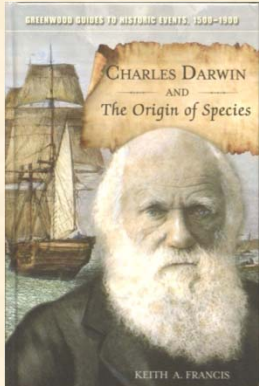
“If you wou’d not be forgotten,  
As soon as you are dead and rotten,  
Either write things worth reading,  
Or do things worth the writing.”

—Benjamin Franklin a.k.a. Richard Saunders  
in *Poor Richard’s Almanack* – May 1738.



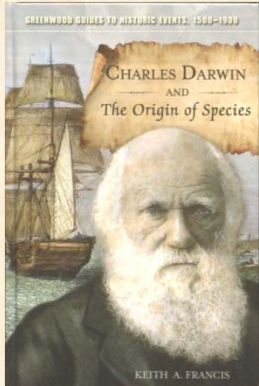
## Darwin, Charles (1809-1882)

- Darwin was born about the same time Thomas Jefferson was ending his term as U.S. President
- Toward the end of his life, Darwin published a number of letters in what was then a new journal - *Nature*



# Darwin's publications:

- 16 books (not counting translations, reprints, etc.)
- 166 publications in magazines and journals
- 28 miscellaneous items (book prefaces, pamphlets, testimonials, etc.)
- Last date he published anything was 1903 (posthumous publications by his son, Francis)

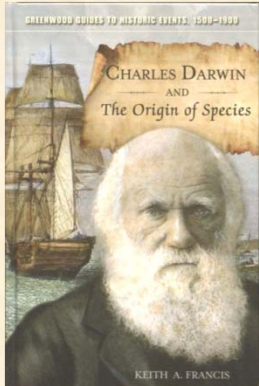


## Darwin in Traditional Library Resources

*WorldCat*

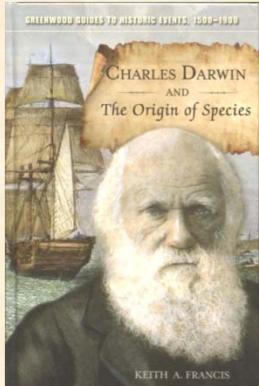
Most widely held books by Darwin

Title	Editions	Languages	Libraries
<i>On The Origin of Species</i>	615	26	5639
<i>The Voyage of the Beagle</i>	435	16	4438
<i>The Descent of Man</i>	278	15	2314



What is Darwin's  
citation impact?

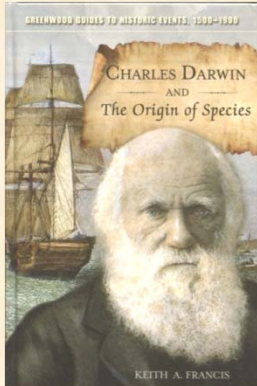




# What is Impact Factor?

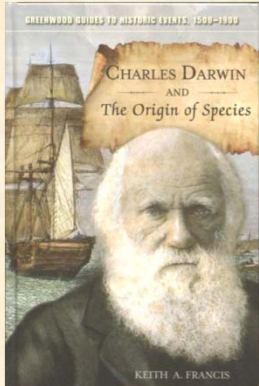
The average number of citations per paper for a journal

- Citation Impact for a specific author can be total number of citations or the average citation count per article
- The ***h-index*** quantifies both the actual scientific productivity and the apparent scientific impact of a scientist.



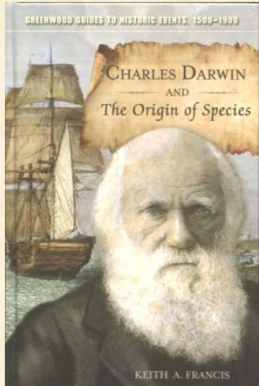
# *h*-index

- The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other people's publications.
- Benefits authors who have been publishing for a long time – likely to have been cited more.
- Eliminates completely publications with few or no citations.



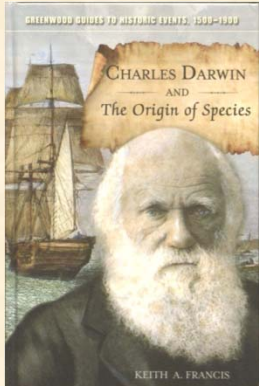
## Caveats:

- Numerous volumes of “collected works” have added to the body of citations.
- Darwin never published anything with his middle name or initial on it; however, citations to his works will occasionally include the middle initial R (for Robert).



## Caveats:

- Later editions often changed the title slightly – such as “Foundations of the Origin of Species” or “The Illustrated Origin of Species”
- Numerous citations are impossible to track back to a specific publication due to incomplete or mangled citations



## Darwin in Traditional Library Resources

### *Web of Science*

- Darwin C as cited author = 4,621 separate entries for cited publications
- (Darwin C\* as cited author) and (ori\* spe\* in cited work) = 7,892 cited references since 1945!
- 965 separate entries for individual editions, cited chapters, etc. , of the *Origin of Species*
- Most recently cited date = a month ago

*Web of Science* results for *On the Origin of Species* (cont.):

There is a huge variety of subject areas beyond evolutionary ecology, including:

10 in sport sciences

11 in applied mathematics

13 in surgery

18 in astronomy and astrophysics

19 in poetry

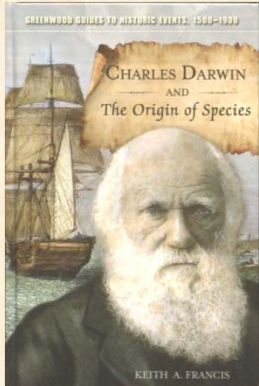
20 in computer science

23 in management

23 in linguistics

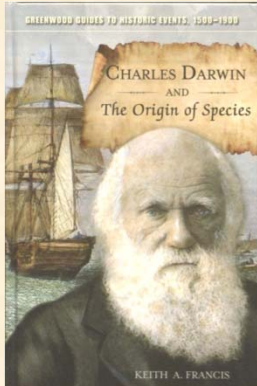
51 in economics

96 in literature



# *Web of Science* summary

- Darwin's  $h$  index within *Web of Science* = 23
- Average citation count per pub = 110
- 273 citations (published after 1944) cite "communication" with Darwin



## Darwin Cited on the Internet *Google Scholar*

- Darwin, Charles as cited author  
821 entries with 31,282 citations
- Limiting to just *On the Origin of Species*  
382 entries with 25,165 citations
- Average citation rate per pub. = 196



## Heaviest-cited Darwin publications are books

	<b>Web of Science</b>	<b>Google Scholar</b>	<b>Total</b>
<i>On the Origin of Species...</i>	7,892	25,165	33,057
<i>Descent of Man...</i>	5,169	5,799	10,968
<i>Expression of the Emotions in Man and Animals</i>	3,274	3,875	7,149
<i>Different forms of flowers on plants of the same species</i>	997	922	1,919

## Darwin's top-cited journal articles

	<b>Web of Science</b>	<b>Google Scholar</b>	<b>Total</b>
"On the movements and habits of climbing plants"	114	161	275
"On the tendency of species to form varieties..."	91	98	189
"Biographical sketch of an infant"	153	21	174
"Notes on the Fertilization of Orchids"	12	80	92

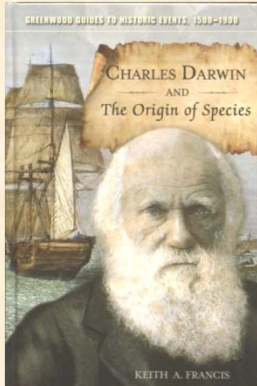
## Something to think about:

“...for the total ISI database [*Web of Science*], the average cited article is most heavily cited when it is two years old.”

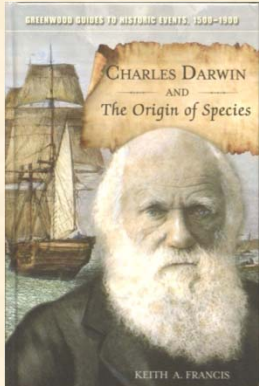
Moed, Henk F. (2005). “Citation analysis of scientific journals and journal impact measures.” *Current Science*, 89(12): 1990-1996.

## Darwin Citation Summary

	<b>Web of Science</b>	<b>Google Scholar</b>	<b>Total</b>
Darwin as cited author	23,069 cites	41,187 cites	64,256 cites
Average cite rate per publication	110	196	306
Average cite rate per journal article	3	4	7
<i>h</i> index	23	50	28
Number of pubs NOT cited	114	128	95

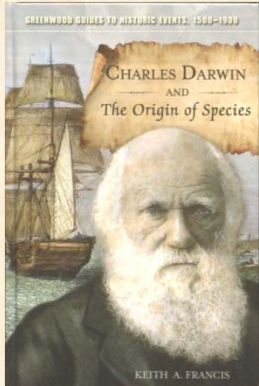


How does Darwin's citation rate  
stack up to modern day  
evolutionary biologists?



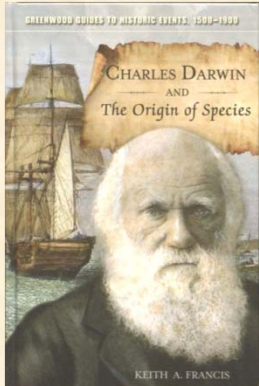
“Inspection of a sample of 18 [currently living] evolutionists and ecologists ranked by Thompson Scientific as ‘highly cited’ yielded a mean  $h$  of 45.0”

--from Kelly, Clint D., and Michael D. Jennions. 2006. “The  $h$  Index and Career Assessment by the Numbers.” *Trends in Ecology & Evolution*, v. 21, no. 4 (April): 167-170.



“Average impact factors [for journals] differ not only over time, but across fields...Over the period 1994-2005, the average impact factor [for all journals in the study] increased by about 2.6% per year.”

--from Althouse, Benjamin M., et al. 2008.  
“Differences in impact factor across fields and over time.” *Journal of the American Society for Information Science and Technology*, v. 60(1): 27-34.

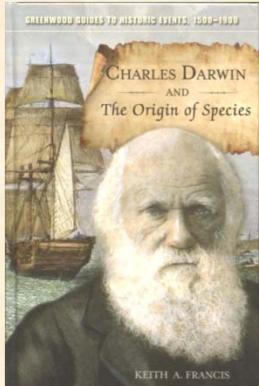


## Average citation rates per article:

Ecology/Environment	14.3
Molec. Biol. & Genetics	24.8
Biology & Biochem.	19.5
Multidisciplinary Science	10.6

--from Aksnes, Dag W. 2003. "A Macro Study of Self-Citation." *Scientometrics*, v.6(2): 235-246.



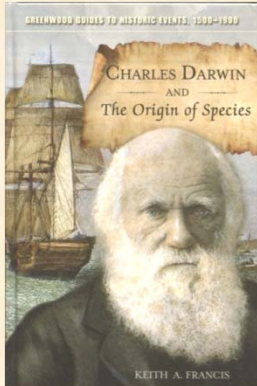


## Darwin Cited on the Internet

*YouTube* videos = 11,700 entries

*Flickr* photos = 6,130 entries

*Scribd* uploaded documents = 16,000+ entries

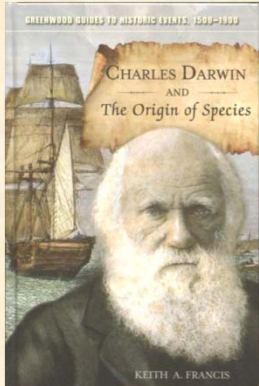


## Darwin Cited on the Internet

facebook

423 Darwin-related Facebook groups – including:

- “Charles Darwin is My Hero!!!” – 2,127 members
- “Charles Darwin Made it Possible to be an Intellectually Fulfilled Atheist” – 487 members
- “Brad Harrub Makes Charles Darwin Look Like a Monkey!!” – 314 members
- “Charles Darwin was a QUACK!” – 168 members



## Elsewhere on the Web

### ***Darwin Digital Library of Evolution***

<http://darwinlibrary.amnh.org/>

Bookmarked by 84 people on del.icio.us

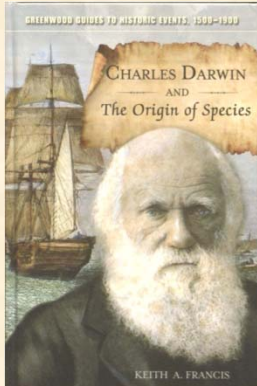
Linked to by 138 other websites on the Internet

### ***Complete Work of Charles Darwin Online***

<http://darwin-online.org.uk/>

Bookmarked by 3,588 people on del.icio.us

Linked to by 2,570 other websites on the Internet



# Elsewhere on the Web

## ***Darwin Correspondence Project***

<http://www.darwinproject.ac.uk/>

Bookmarked by 248 people on del.icio.us

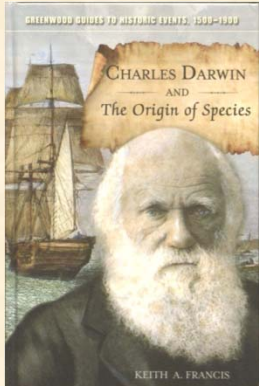
Linked to by 926 other websites on the Internet

## ***Charles Darwin*** Wikipedia article

[http://en.wikipedia.org/wiki/Charles\\_Darwin](http://en.wikipedia.org/wiki/Charles_Darwin)

Bookmarked by 65 people on del.icio.us

Linked to by 497 other websites on the Internet



# Elsewhere on the Web

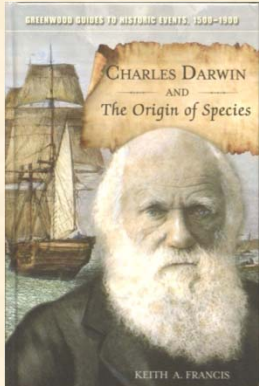
## *Darwin Awards*

<http://www.darwinawards.com/>

“A Chronicle of Enterprising Demises honoring those who improve the species...by accidentally removing themselves from it!”

Bookmarked by 2,528 on del.icio.us

Linked to by 1,800 other websites on the Internet

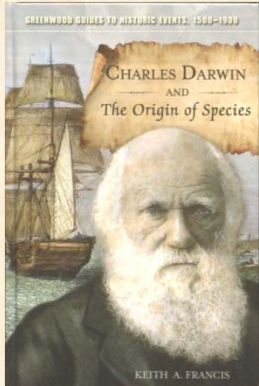


# Darwin was not the 1<sup>st</sup>

to expound the concept of all organisms being descended from a common ancestry – “what was original is that he made the idea scientifically respectable by proposing the mechanism of natural selection.”

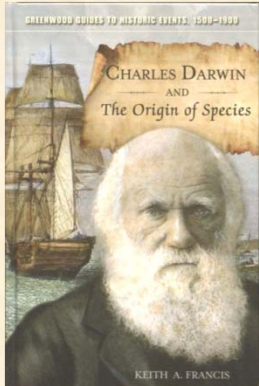
From Bowler, Peter. *Charles Darwin: the man and his influence*. Oxford: Basil Blackwell, 1990, p. viii.

Bowler goes on to say that Darwin’s writings are “deceptively easy” to read by laypersons as well as scientists.



“Never assume anything merely because most supposedly wise men believe it. The whole history of scientific advance is that only when a pack of learned fools are shown conclusively to be wrong is progress made.”

From: Bruce, Colin. *The Einstein Paradox: And Other Science Mysteries Solved by Sherlock Holmes*. Reading, MA : Perseus Books, 1997, p.27.



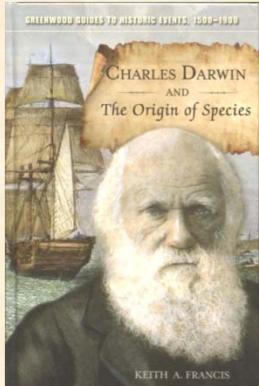
## **The role of the library is:**

To provide resources on all sides of an issue for individuals to make up their own minds about what they believe

To serve as a place for individuals to come together and discuss & learn

To stimulate intellectual curiosity





Please visit Special Collections to see  
Darwin display

Panel: Darwin and Me:  
12 Feb at 7:00 pm Cardinal Room, MU

Lecture: Secular vs. religious ethics  
13 Feb at 7:00 pm Campanile Room, MU

Lecture: Darwin's Gift to Science and  
Religion  
18 Feb at 8:00 pm Sun Room/South Ballroom, MU